



Science News-Letter

The Weekly Summary of Current Science

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A Science Service Publication

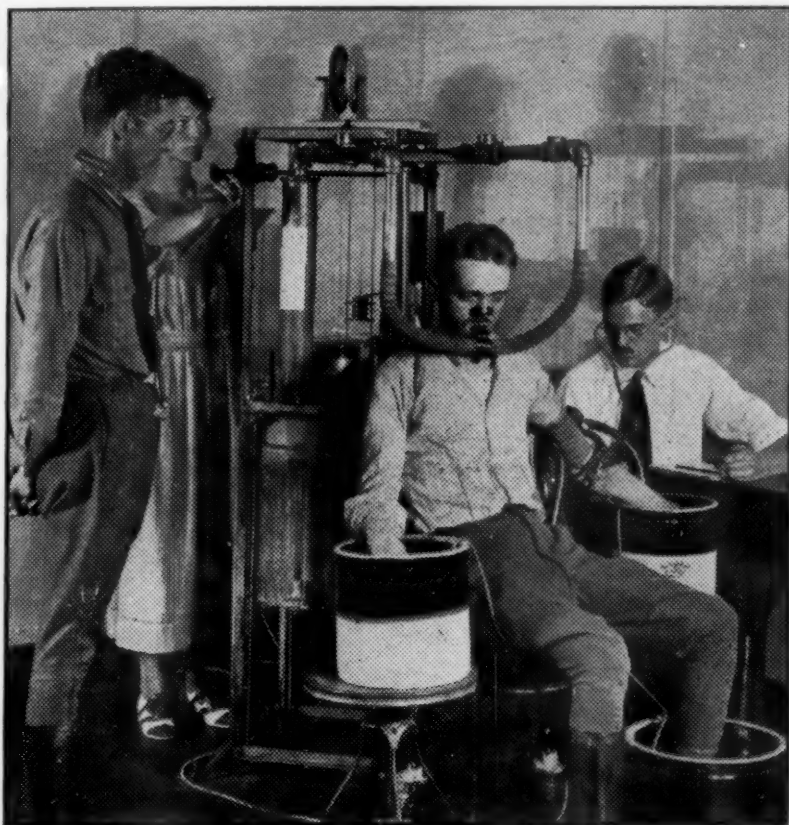


Edited by Watson Davis
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August 20, 1927

PHYSIOLOGY-PSYCHOLOGY

Are You fit to Drive an Airplane?



ALTITUDE CLASSIFICATION TEST. Making electrocardiograms during test. Official Photograph, U. S. Army Corps

By GLADYS MOON JONES

How often have you said, "If this old bus just had wings I would fly over this torn-up street." It seems difficult to manage an automobile through the city's bottle-necks. It takes physical and moral stamina.

Suppose your automobile should begin to fly. Could you pilot it? Could you handle an aeroplane? You could learn how to drive one perhaps, but have you the physical and mental qualifications essential in a competent flyer?

Specialists in aviation medicine have come to know more definitely just

what an A1 pilot must be. Several opinions held during the war have been modified. Most important of these are the age and ear requirements. It was formerly thought that only young men could fly successfully. Twenty-four was old in aviation. Now, however, you may be as old as thirty-five and still make a good flyer.

If you can negotiate communication with your co-pilot or co-passenger, you may be deaf and still make a good aviator.

Aviation hygiene is an important new subject. Today's physician is studying the matter. Tomorrow's

will advise us before we hop off and prevent our suffering from physical causes as well as from aerial diseases, dope poisoning, deafness, altitude faintness and other troubles. Day-before-yesterday's country doctor, who drove around with his horse and buggy at eight miles an hour, picked up those who had fallen from the higher plane of perfect health. More often than not, he was too late. However, he went out of fashion with his equipage. Medical men have long since seen that warnings before the fall were simpler and more efficacious than mending the troubles afterward.

Flight Surgeons New Specialists

When flight surgeons came along with the development of aviation during and since the World War, they too, at first, gave most of their attention to those who crashed. Now, with their confreres, general and special practitioners, they are preaching prevention. They have proved that from the very first pilot test, preventive hygiene means a great reduction of danger to man and plane. They have found that people who walk the earth untroubled by minor variations from the normal encounter aggravated conditions in rarefied air and rapidly changing temperatures.

Would-be pilots are of two general classes with respect to altitude: fainters and non-fainters. The Army knows its unrestricted men, those who can go safely only to 15,000 feet and those who are still restricted to 8,000 feet. All flying above 18,000 feet must be done with oxygen. The limit of consciousness without oxygen is about 25,000 feet. Even with oxygen the limit of altitude is between 40,000 and 45,000 feet. This is because the effects of altitude depend not on oxygen percentage, but on oxygen pressure. If pure oxygen is breathed

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Are You Fit for the Air?

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we may still get so high that its pressure is too low to sustain life.

If Lieut. James H. Doolittle of the Army can do an outside loop at about 350 miles an hour, causing his eyeballs to become so extended that they touch his goggles, it does not follow that every one should try it. The best pilots "go black" at 250 miles an hour on a turn.

Just what per cent. of the youth of this country is potentially Lindberghian is a question of intelligence tests and physical tests. Out of 547 midshipmen of the class of 1927 at Annapolis, 353 passed the Navy's pilot tests. An official estimate is that fifty per cent. of those who apply for training at Pensacola get there. Of these thirty per cent. pass the pilot tests. And of this thirty per cent. approximately twenty per cent. make A1 pilots. From these estimates the ambitious boy can figure for himself that he has about one in twenty-five chances to succeed in aviation.

A flier does not have to go into the air to learn what the pilot testers call his reaction times or how his coordination is effected by overwork, loss of sleep, exposure, digestive disturbances and alcohol.

Lindbergh, the pioneer, learned much about his remarkable physical machine by trying it out on his mail route, but many a good man has crashed to his death trying to know what could have been told on the ground after a few physiological and psychological tests. Medical officers would have us get over calling those "heroes" who unnecessarily expose themselves to mortal danger.

The hypersensitive individual is easily confused by rapid changes in position in respect to his environment. The tested pilot becomes immunized to rapid changes in motion. He is able to interpret his sensations so that

he shows little reaction to rotation or other rapid changes in position. An apparatus was developed during the war known as the Ruggles orientator. Some one wrote in to the Army asking for a picture of "that whirling bath tub." And that is what it looks like. An experiment is being conducted now in the Navy Bureau of Aeronautics, which predicts even more accurate success for this orientator. Attached to the Ruggles "tub" is an instrument, operated electrically, which will make a graphic record of the testee's reaction times. Eight different pens are set to make the graphs on paper marked off in tenths of seconds. The resulting graphic demonstration shows the automaticity of the man being tested.

Aviation medicine is practiced in three directions: the selection, the classification, and the care of the flyer. As a result of this specialization in the Army and Navy, the percentage of aviation accidents due to physical causes has decreased in a surprising manner. Since we have had well trained flight surgeons and soundly based and conducted examinations, the fatalities per flying hour have been reduced in a period of four years from one fatality to every 950 hours to one for every 3,460 hours.

Visual Judgment Necessary

According to Comm. Robert G. Davis, Medical Corps, U. S. Navy, the eyes are the most important factor of flying physical requirements. The flyer must see out sidewise when he is looking straight ahead.

Visual acuity alone will not suffice as there must be a perfect balance of each extrinsic muscle allowing the maximum of binocular vision with no tendencies to diplopia or nystagmus. Dust, oil, wind and glare are prone to produce congestion of the lids and conjunctivae, which if allowed to progress may greatly impair visual

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EVOLUTION

Short Big Toe Ape Relic

A short big toe, probably a survival from the times when big toes were short and thumb-like to aid in tree climbing, is the guilty cause of a painful foot trouble. *Metatarsus atavicus* is the name given by its discoverer, Dr. Dudley J. Morton, of the department of surgery of the Yale School of Medicine, to the new foot disorder, "atavicus," referring to the evolutionary properties of a short length first toe.

In the normal foot, Dr. Morton explains, the basal joints of the big toe and the second toe are nearly opposite but in the cases he has observed the big toe joint is much closer to the center of the foot than the joint of the second. After strenuous exercise like tennis, dancing and hiking, this condition may result in severe pain in the front of the foot.

Dr. Morton believes that the malformation is a mild throwback to a prehuman type of foot and bears out his contention by citing the fact that almost all his cases were women, the female sex being notably conservative, in scientific estimation, in taking on new evolutionary traits and foibles. He admits, however, that high heels may have something to do with the matter.

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ARCHAEOLOGY

Maya Pyramid in Mexico

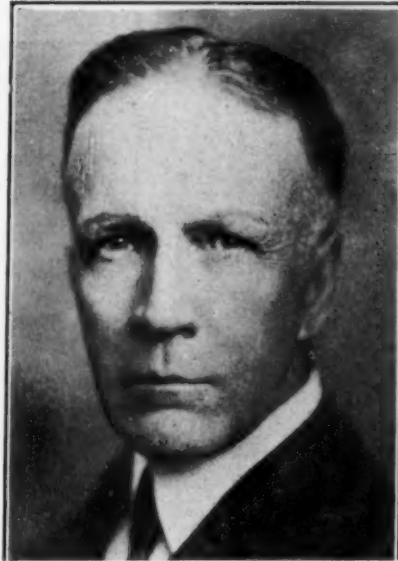
The ruins of the large Maya pyramid, which may mark another important archaeological zone in Mexico, have been found in the jungles about seven miles from Comitan, a town in Chiapas, according to a report from the Secretary of Education. The discovery was recently made by a Federal inspector of rural schools, and descriptions and photographs of the sites have been received by the Department of Archaeology.

A large emerald, now said to be in the possession of the president of Guatemala, was reported to have been found in a cave near the pyramid, where amateur explorations had been made. The report of the inspector also states that near the town of Tapachula, also in Chiapas, southern Mexico, a carved stone monument has been discovered, believed to be a stela with numerous Maya hieroglyphics.

Science News-Letter, August 20, 1927

Horses of early kings often wore shoes of gold or silver.

PSYCHOLOGY



ROBERT H. GAULT

"Vibro-Tactilist"

To most of our readers, "vibro-tactilist" probably conveys little meaning, neither does "teletactile audition," but both are new words that Dr. Gault has coined to describe his work. Teletactile audition means the hearing of sound through the skin, a possibility which Dr. Gault has demonstrated, and which some day may enable the deaf to hear.

"Hearing by touch" is made possible by means of the "teletactor" an instrument that has been developed for Dr. Gault by the Bell Telephone Laboratories. The vibrations that correspond to speech are carried to the skin of the "hearer" by the instrument, and it is through that that he recognizes them as having some meaning.

Quite recently he has shown that the skin is able to detect vibrations as rapid as 2,700 per second, and perhaps as high as 3,000. Previously, a frequency of 1,600 per second was supposed to be the limit.

Dr. Gault was born in Ellsworth, Ohio, on November 3, 1874. He studied at Cornell and at Clark, and then took his doctorate from the University of Pennsylvania in 1905. In 1909 he joined the faculty of Northwestern University. Since 1917 he has been professor of psychology, though in the last three years he has been absent on leave to work on the "teletactile audition" problem. This work has been under the auspices of the National Research Council. First it was done at Gallaudet College in Washington, and later at the Vibro-Tactile Research Laboratory at Smith College, in Massachusetts.

Science News-Letter, August 20, 1927

Broadcast Gunfire

The old question of why sound sometimes travels much farther than at other times may be answered as a result of experiments soon to be made in England, when the firing of big guns will be broadcast by radio from the artillery proving grounds at Shoeburyness. People for miles around will have the opportunity of hearing the guns by radio, and then, several minutes later, of hearing the actual sounds as they travel through the air.

This announcement is made by Dr. F. J. W. Whipple, of the Kew Observatory in *Nature*, the English scientific magazine. He says that at Grantham, about 80 miles from Shoeburyness, he has heard the firing of the guns between 10¾ and 11¼ minutes after they were discharged. Such abnormal distances for sound seem to be the result of an effect something like that of the Heaviside layer, which reflects radio waves down to earth again instead of letting them go out into space. Dr. Whipple says that it is agreed that such long range sound records are the result of a layer of the air some 25 miles or more above the earth's surface, where the temperature is relatively high, and the sound waves are refracted down to earth again. Thus, a sound that might be inaudible at 20 miles distance might be heard at a hundred.

The broadcasting of the times of firing will make it possible for observers throughout southeastern England to tell when the sounds start and when they reach them, if they reach them at all. Dr. Whipple believes that the best "reception" of the actual sound waves, reflected from the upper air layer, will be about 120 miles from Shoeburyness.

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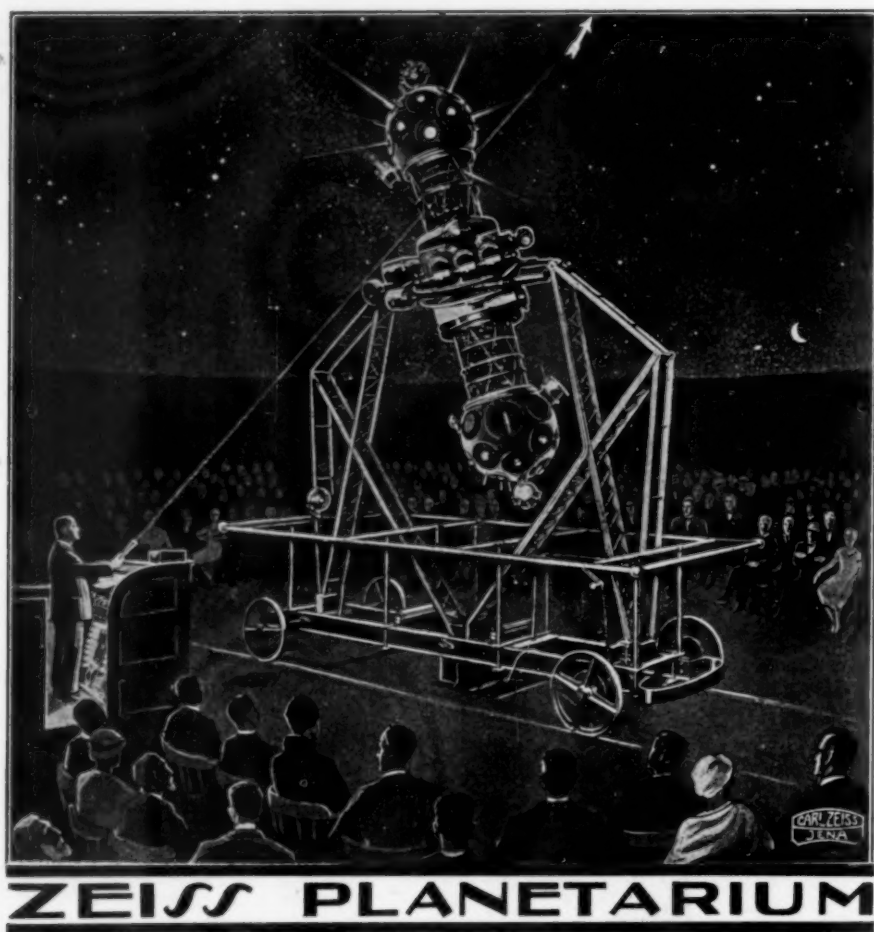
PHARMACOLOGY

Diabetes Drug Disappointing

Early accounts of clinical tests of the new diabetes drug, synthalin, which medical men believed would duplicate the action of insulin have proved disappointing. Two French physicians have failed to find the new preparation of great value in the treatment of 27 cases of diabetes on which they have tried it, according to the Paris correspondent of the medical journal, *Lancet*.

The discovery of synthalin by Dr. E. Frank of the University of Breslau in Germany stirred up considerable hopefulness among the medical profession at the time of its announcement last spring on account of the fact that it could be taken by mouth instead of hypodermically.

Science News-Letter, August 20, 1927



"Take more time for Scientific Sight-Seeing"—

says Julius Rosenwald, head of Sears-Roebuck.

Why not include a visit to a Zeiss Planetarium on your next European trip? Imagine a gigantic projector with 119 lenses, showing 5400 stars, the sun, moon and the planets, as well as clusters and nebulae, going through their motions at any desired speed. Never has there been an entertainment so instructive, so fascinating and of such general appeal.

It's a school, a theater and a movie—in one. A drama under the dome of heaven, with the celestial bodies as actors. This stellar fairland may now be seen in Jena, Berlin, Dresden, Leipzig, Düsseldorf, Nuremberg, Mannheim, Barmen and Vienna.

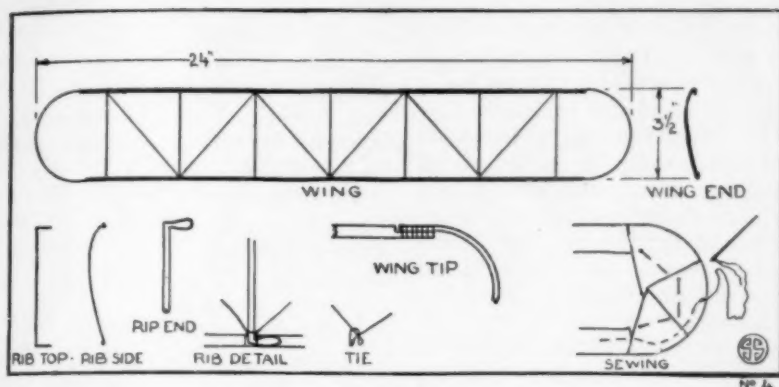
Truly, one of the wonders of the world. Don't fail to see it. There's nothing like it.

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Say you saw it advertised in the SCIENCE NEWS-LETTER

Building and Flying Model Airplanes



Making the Wings

This is the third of a series of articles by Paul Edward Garber, telling how to make model airplanes. Mr. Garber is in charge of Aeronautics at the Smithsonian Institution.

Now that our model airplane has its frame, propeller and rubber motor, it must be fitted with wings.

Inasmuch as the wing supports most of the weight of the model when in flight, it should be made to embody the utmost efficiency; it should be light and strong, and must be made true so that the model will fly straight.

The following materials are required:

2 pin sticks, 21"x1/8"x1/16"; 36 inches of No. 16 aluminum wire; 1/4 yard china silk or thin paper; thread, needle and pins; glue and wing solution.

To commence construction, smooth the two sticks with sandpaper, and find the center of each. Make marks outward from the center three inches apart, and cut a slight recess in the end of each stick as shown in the detail drawing marked "wing tip."

Next take the wire which should be No. 16 aluminum, but if this cannot be obtained other light wire slightly smaller in diameter than a pencil lead will do. From the wire cut seven pieces, 4 inches long for the ribs. Cut the remainder in half and from each piece form two semicircles, with extended ends. The radius of the semicircles is to be 1 3/4". These are the wing tips.

Take each rib, and bend the ends at right angles, for a distance of 1/4 of an inch as shown in the detail drawing, "rib top." Each of the ribs thus formed is to be again bent into a curved shape as shown in the detail drawing, "rib side." It will be noticed that this curve is somewhat like a parabola. It is the correct shape for securing lift from the wing. These must all be alike. The end of each rib is to be slightly

flattened as shown in the detail drawing "rib end," to facilitate binding it to the sticks. This flattening can be easily done by holding the rib on a piece of iron and hitting the tip with a hammer.

The next step is to bind each rib onto the sticks at the points marked. The greatest curve of the rib must be in front. When this ladder-like frame is completed it should be strengthened against lateral play by running a thread diagonally from rib to rib as shown in the plan drawing of the wing. The detail drawings "rib detail" and "tie" illustrate how the thread is tied about each rib and carried on to the next. While making these ties be sure that each thread is tight and that the ribs are kept at right angles with the sticks. The next move consists in tying on the wing tips. This is done as shown in the detail drawing "wing tips."

This completes the frame. It must next be covered. This can be done with either silk or paper. If the latter is used a piece slightly larger over all than the frame is secured. The center sections of the frame are covered with glue and the paper applied, making sure that it is drawn tightly leaving no wrinkles. Each succeeding frame is covered and when the tips are reached the paper is folded over them and trimmed with a slight margin, which is glued to the under surface near the tip wire. The tendency in stretching the paper should be to pull it laterally rather than from edge to edge, so as to preserve the curve of the wing.

If silk is used it is applied in the same way, but the ends can be made neater if they are sewed as in the detail drawing "sewing," which shows the cloth at the end folded over and pinned, after which a plain stitch is taken close to the wire, and finally the excess cloth is cut off.

(Just turn the page)

Ruins May Bridge Gap

Important prehispanic ruins in northern Mexico, of a civilization that bridges the gap between the Pueblo culture in the southwestern United States and that of the more advanced culture of the Aztecs and Mayas in southern Mexico, have recently been inspected and studied by Dr. Eduardo Noguera, of the Department of Archaeology of the Mexican Department of Education.

The ruins are of a fortified city on the crest of a hill about 35 miles southeast of Zacatecas, the capital of the state of that name. The locality was apparently chosen for defense, Dr. Noguera says, and suggests that the prehistoric town was surrounded by enemy tribes. The hill is about 500 feet high and over 3000 feet long at its greatest point, and where it is not naturally defended by steep cliffs it is surrounded by stone walls which are double in some places.

The hill is a series of five terraces, and each terrace has its groups of buildings. The approach is guarded by a small pyramid and from there an avenue leads uphill to the first terrace. Minor avenues lead to other parts of the hill and to other edifices.

On the first terrace is a great "salon" about 130 by 100 feet. It is surrounded by a wall, and within are 11 pillars constructed of stone. They are at irregular distances from each other but are placed at regular distances from the walls. Their purpose is a mystery. Even in their ruined state the highest of them are over 17 feet.

This salon leads to another many times larger and also surrounded by walls which open at the east end and give access to a small pyramid. A third pyramid on the same terrace is of a peculiar structure in that its top is not truncated as in the case of all other known pyramids of the Mexican Indians. It is about 50 feet high and 35 feet at each base line.

A fourth pyramid of this ancient Indian city has a series of rooms of different sizes built into one of its sides. Although this structure is in a very bad state of ruin, the material that remains gives an idea of what it was in its heyday.

The best preserved edifice of all is another pyramid in an adjoining quadrangle. It is 33 feet high and has a series of rooms or living quarters.

The material out of which this city of pyramids is built is yellowish gray porphyry coming from the geological formations of the hill on which the

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Ruins May Bridge Gap

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city stands and others in the vicinity. The stone fractures easily and the building blocks are of uneven sizes, but none over six or eight inches long. The mortar used is of red lime mixed with straw.

The ruins have been known for over twenty years but they have been neglected by scientists, both American and Mexican, mainly because the large number of Maya and Aztec remains in other parts of Mexico have detracted from others by their greater artistic aspects. But from a scientific standpoint these ruins are of the greatest importance, Dr. Noguera says, and will open a new horizon in American Indian archaeology. So far no excavations have been made in search of pottery and implements which will give a picture of the lives of this unknown race of pyramid builders.

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In some old Greek cities it was customary to sacrifice 100 oxen to the gods when a citizen discovered a new theorem in geometry.

The tunnel being built through the Cascade Range in Washington State will be 7.78 miles long and will pass 2,000 feet under the mountains.

BINDER COVERS FOR SCIENCE NEWS-LETTER

Many subscribers have expressed a desire for a convenient binder in which to file their copies of the Science News-Letter. We therefore have prepared an attractive and durable loose-leaf binder-cover of gray leather-like stock, printed in dark green and complete with fasteners. Each binder-cover will hold one volume (six months or 26 issues).

To facilitate punching the issues of the Science News-Letter to fit this binder-cover, a pattern showing where holes should be placed appears each week on the back cover page.

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Airplanes

(Continued from page 117)

Cloth must be painted with some solution to make it air tight. The solution may be collodion, which is sold at drug stores, or it may be a solution composed of celluloid dissolved in banana oil. A piece of celluloid can usually be found about the house in the form of an old comb or brush back, tray, etc. Banana oil is sold at paint and art stores. Celluloid is put in the oil until no more can be dissolved, after which the solution is ready to be applied. It should be brushed on thinly. If the constructor has access to a flying field he could procure some regular airplane wing solution, known familiarly as "dope." This makes an ideal model wing solution, especially if thinned with acetone, a drug store product.

After covering, the wing should be laid on a flat surface, to insure its remaining true while the rest of the model is completed.

Next week we will take up the construction of the elevator or smaller wing, after which the model will be finished and ready for flying.

Science News-Letter, August 20, 1927

If one pair of English sparrows increased without hindrance for 10 years, it would have over 275 billion descendants.

A traveling tank built into a motor truck is used to transport young fish comfortably from hatcheries to streams, in Idaho.

The skull of a child who lived in Peru 500 years ago shows signs of rickets, indicating this childhood disease is not a recent plague.

Some of the horses brought to this country by the Spanish explorers escaped and started growing herds of wild horses in the United States.

The Grand Canyon of the Colorado River is America's outstanding example of the enormous power of rushing water to wear away the land.

Government economists are studying clothing worn by children to determine the most efficient ways of cutting materials and the most healthy clothing standards.

One scientist has described the defensive odor of the skunk as comparable to a mixture of perfume musk, essence of garlic, burning sulphur, and sewer gas, intensified 1,000 times.

News-Letter Features

Born over four years ago of the demand and interest of those individuals who had caught a glimpse of *Science Service's* news reports to newspapers, the *SCIENCE NEWS-LETTER* has since proved interesting to laymen, scientists, students, teachers and children.

Into the pages of the *NEWS-LETTER* are fed the cream of *Science Service's* output directed at the newspapers of the world. To this is added material especially prepared.

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It is a *separable magazine*. You can clip or tear out any article without losing or damaging another article on the other side.

Each article is automatically *indexed* by the key word printed above its heading. Articles can thus be filed easily into any system of classification.

Each article is automatically *dated* by its last line.

The current *news* of science, reported for *Science Service* by its own staff and correspondents throughout the world is presented and commented upon in each issue.

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The *classics of science* and striking passages from current books, addresses and periodicals are carefully selected and published.

Important *anniversaries* of science are appropriately noted week by week in a special department.

Regular articles tell of the happenings in the *skies* and in the great outdoors.

Photographs aid in the telling of the week's science.

Great care is taken to keep its editorial content not only *interesting* but *accurate* as to fact and implication.

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Early blooming, hardy chrysanthemums that can be grown in northern gardens are being sought by government tests.

Ginseng grown in Manchuria was once reserved as a rare and potent medicine for the exclusive use of the imperial household in China.

Ivory is properly the material of the elephant's tusks, but some rhinoceros horns and hippopotamus teeth find their way into the ivory market.

Are You Fit for the Air?

(Continued from page 114)

judgment in depth perception for landings or formations in the air.

Everyone who has learned to drive even the slow old automobile knows how important visual judgment is. It may be impaired by an attack of influenza, prolonged application of the eyes to close technical problems and by general staleness.

A typical stale flyer complains of having lost some of his keenness and flying judgment. He is discouraged, not sure of himself in the air, has lost his appetite and dreams of unpleasant flying experiences. He is irritable, short of breath and attributes his condition to trivial causes. If his condition becomes worse he must be permanently grounded. His symptoms are those of neurocirculatory asthenia or effort syndrome.

Edward C. Schneider, of Wesleyan University, Middletown, Conn., who years ago made experiments on Pike's Peak in a study of altitude, is one of the authoritative physiologists who have been researching in aviation medicine. He defines staleness as "a neural condition founded on chemical changes within the body."

Ear Considered Less Important

The inner ear was originally considered most important in this country, but not according to the present theory. Equilibrium is important, but it is a function of vision, deep muscle sense, sensations from bones, joints and tendons, gravity effects, and tactile sensations as well as the inner ear.

However, the ears of the flyer demand constant attention. The necessity of equal air pressure on each side of the drum is thoroughly appreciated by the aviator. Equalization of pressure can be obtained in a measure by swallowing. Experienced flyers carry out the practice on rapid descents. Unless the eustachian tubes are easily opened the flyer should be kept out of the air. Marked unequal drum pressures produce severe pains and probable perforation. Scarred or congested drums are disqualifying on selective examinations. Some aviators have found protection in a powder puff sewed in each flap of the helmet.

Sound Nervous System Necessary

Defects of nerves constitute the commonest causes of accidents and removal from flying status. Army and Navy fliers are subjected to a psychoanalytic test. By a complete study of the personality and a review of the entire life, the tendencies,

✓Emotional Stability-----Reaction✓
X Superior Education-----Coordination✓

X Ears-----Eyes✓
-----NoseX
-----ThroatX

✓Lungs-----Heart✓

✓Digestive-----Kidneys✓
System-----

-----Steadiness✓

-----Bones✓

✓ Joints-----



THINGS ABOUT AN AVIATOR THAT MUST BE PERFECT are checked; those parts that need not be are marked with an X

resistances and potentialities of the nervous system can be determined.

Therefore, when you go for your examination a conversation like this will be in order:

"What is the first, the very first memory you have?"

"I remember falling off the garden fence," answers the would-be aviator.

"Do you find yourself thinking of falling when you are on high places?" asks the examiner anxious to follow up and unearth a possible complex.

"No, never."

"Well, how about your early life in school? Did you enter into all games? Did you engage in fist fights with your playmates?"

So the questions go. The trends and reactions to stresses in the past life form the basis of a prophesy of the probable reactions to the stress of flying.

Much has been written about the abstinent, non-drinking, non-smoking life of Lindbergh. His cool-headedness was proved long before he hopped the Atlantic by no less than four parachute jumps from unmaneuverable planes. Such quick reaction

time is essential in a flyer. There is often a situation where almost automatic reaction is necessary. Reaction includes coordination of complicated arm and leg movements.

Chilling Must Be Prevented

It is necessary to prevent body chilling. Clothing is a most essential consideration. It varies according to the flight undertaken. Altitude, weather conditions and the degree of protection afforded by the type of plane are all to be considered. The temperature drops five degrees Fahrenheit for 1,000 feet of altitude. At thirty to forty thousand feet a temperature of seventy below zero is encountered. The body must be kept surrounded with warm layers of air between several layers of loose-fitting wool or silk. The mesh and not thickness prevents heat loss. Freedom of movement is essential and ready removability must be insured by a metallic rip arrangement. A thin layer of cold cream on the face is a marked protection.

Adequate physical exercise is necessary for every one and indispensable

(Just turn the page)

Are You Fit for the Air?

(Continued from page 119)

for fliers. During the war physical trainers were attached to all aviation units and sports and games were part of the daily routine. A good athlete has much toward becoming a good aviator. Eye and limb coordination, mental alertness, high efficiency in respiration and circulation and morale are all to be gained by enjoyable exercise. The tone of thoracic and abdominal muscles is increased and metabolic activity of the tissues stimulated by swimming, rowing, golf, tennis, handball and other favorite recreations. A body kept hard by outdoor life, covered with loose clothing and given sufficient rest has the greatest known preventives against a tendency to circulatory asthenia. Before making a flight dietary indiscretions must be avoided and liquids limited to reduce kidney stimulation from cold.

Poisoning by dope presents a health hazard. Amyl and butyl acetate, gasoline, denatured alcohol and cellulose make up the standard dope used on the surface of fabrics covering the wings and bodies of airplanes. These are dangerous chemicals. Their concentrated fumes produce headaches and nausea. Death may occur suddenly with symptoms of vertigo. Soluble dope reaching the bowels is best eliminated by a persistent milk diet.

Another recent addition to aviation hazards has resulted from the employment of ethyl fluid which has as its base tetraethyl lead. Danger of lead poisoning requires the usual precautions taken in the lead trades.

Aeronautics in its progress is incorporating the modern equipment of technology and psychology, as well as preventive medical principles. The flight surgeon should keep his men physically and mentally fit to fly. He should know his men intimately and be quick to recognize any condition which the flyer himself may not think important.

Length of Flying Life

Every aviator should be examined every six months and after every illness. This will greatly prolong his usefulness. The English found during the early part of the war that stress of work at the front meant a limited amount of work in the air; that the limit of every flyer was approximately 150 to 300 hours. At the end of the war these figures were greatly improved and now they are better still. Lindbergh has spent around 2,000 hours in the air.

The International Medical Requirements for Air Navigation have been adopted by practically all countries except the United States. The requirements of our Army and Navy are along the same lines. The medical requirements are stricter for pilots

engaged in public transport. They are all required to be examined every six months.

The civil flight surgeon is the man of tomorrow. Aviation medicine is a specialty and only those with special training are qualified to make special examinations. With civilian transport companies carrying both passengers and freight; with the air full of commuters, the civilian physician will need to know aviation medicine. There are opportunities now for him.

There is no doubt that we shall all want to fly. Ernest L. Smith, Emory B. Bronte and Lieuts. Lester J. Maitland and Albert F. Hegenberger tested the radio beacon as a guide to a diminutive goal in the sea to prove that we can fly anywhere. The trans-Atlantic fliers tested engine-endurance to prove it. Lieut. Al Williams is trying to show how fast we can do it, and Lieut. James Doolittle, by his amazing outside loop, has shown how sportively we can fly.

The world is moving on at a great rate toward our getting up over the traffic-choked streets, where there is more room. Our children are going to consider travel by air as safe, perhaps safer, than travel on foot. Moreover, health airships and flying sanatoriums are going to be afloat. One in need of rest and change and ultra violet rays will be able to get them in the air no matter on what noisy and smoky part of the globe he has his habitat.

Science News-Letter, August 20, 1927

A fringe of false hair was found in the tomb of an Egyptian Pharaoh who ruled about 3300 B. C.

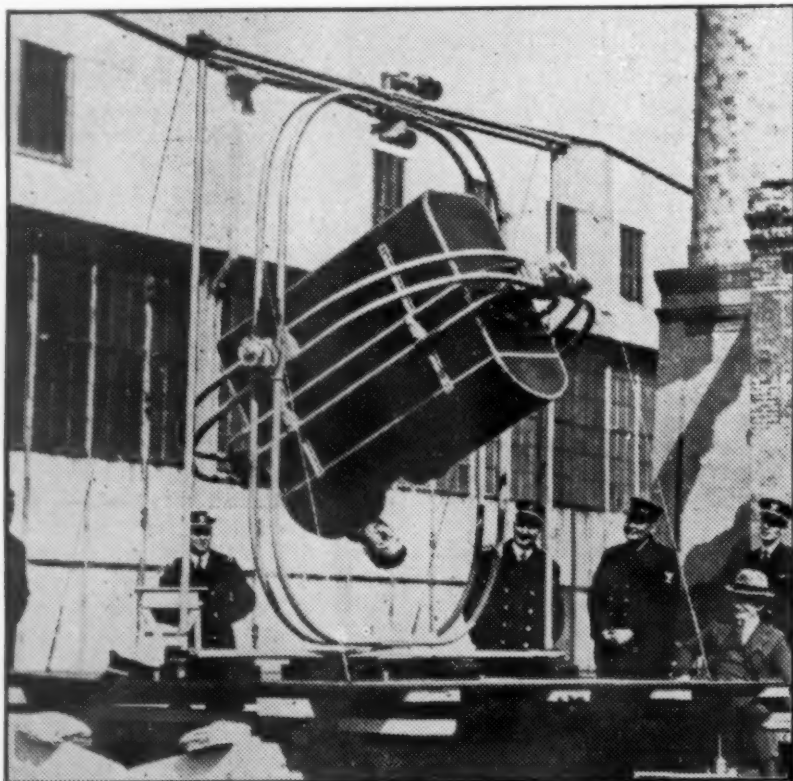
Seeds from Canadian trees are being gathered and sent to England for reforestation work there.

A merit badge is now given to First Class Boy Scouts who obtain an elementary knowledge of meteorology.

An attempt to hack to pieces the face of the Egyptian sphynx was made by a Mohammedan sheik about 1380.

The papyrus plant, which once furnished Egypt with sheets of writing material, no longer grows in that region.

It has been stated that 90 per cent. of the accidents in horse races and riding are due to defective sight of the horse.



THE RUGGLES ORIENTATOR in which the candidate is whirled and tested. William Guy Ruggles, the inventor, is sitting at the lower right

SEISMOLOGY

World's Earthquake Factory

By NICHOLAS H. HECK

Commander Heck is in charge of the U. S. Coast and Geodetic Survey's earthquake investigations.

Earthquakes have occurred in nearly every part of the earth but in only a few regions have they occurred frequently. In these regions, earth shocks—all the way from minor tremors to the kind which cause disaster—have been of almost monotonous regularity.

Japan, for example, has suffered heavy loss in its great earthquake disasters and probably greater losses since its partial adoption of the industrial civilization of the western world. Fortunately, the Japanese people are well qualified to undertake scientific earthquake investigation and the pressure of population has made such investigation absolutely vital.

If it be an advantage to a country to be an "earthquake factory," then Japan is especially blessed. This is illustrated by a remark by Dr. Tanakadate, a leading Japanese scientist. An American delegate to the recent Pan-Pacific Science Congress in Tokyo was discussing the desirability of erecting various types of model buildings in an earthquake region to analyze the effects of an earthquake upon them. "If some one will provide the buildings," said Dr. Tanakadate, "Japan will furnish the earthquakes."

Scientific earthquake investigation has been going on in Japan for years. After the opening of the islands to western civilization, a group of European scientists began the work, and today an organized and well conceived plan of study is in progress.

It might seem, at first glance, that this study has been fruitless, since earthquakes have continued to occur. Earthquakes will probably always occur, at intervals, and doubtless will continue to cause some loss of life and property, especially in thickly populated areas. No amount of scientific study can ever prevent Mother Earth from easing up the accumulated strain on geologic strata occasionally, with a resultant shaking up of the structures dotting her broad bosom. There are very definite possibilities, however, of materially reducing losses in life and property.

Economic conditions, at present, prevent the adoption of some of the ideas thus far developed. Then, too, a lack of knowledge and, often, blind fear on the part of the general public tends to produce a paralyzing apathy which hinders scientific progress materially.

(Just turn the page)

MEDICINE

Infantile Paralysis Waxing

Are we on the verge of another infantile paralysis epidemic like that of 1916?

Late summer and early fall are the times when this little understood disease is most prevalent, but the number of cases reported to the U. S. Public Health Service in the last few weeks have shown a decided gain over those reported for the same period last year.

The figures for the week ending August 6 show 180 cases as opposed to only 66 for the corresponding week for 1926. Ohio reports 79 widely scattered cases, while California has 56 for this last week alone.

Like influenza, *poliomyelitis*, as infantile paralysis is known to medical men, is one of the unfinished problems on which scientists are still hard at work. It is believed to be caused by a filterable virus which is spread by contact with articles that have been touched by the infected person. From the way in which epidemics have spread in the past it is thought that it must be transferred either by animals or human carriers, but at this time little has been definitely established on this point.

In the big epidemic in New York City that occurred eleven years ago it was clearly shown that prompt hospitalization of the cases that could be safely moved checked the spread of the disease more effectively than any other measure. Another outstanding point that emerged from this experience was the fact that isolation of groups of children from contact with other children or adults, even when carried out in the midst of areas where the disease was prevalent, sufficed to protect almost absolutely from infection.

At the Rockefeller Institute for Medical Research attempts have been made to immunize monkeys to *poliomyelitis* but the results were too variable to be useful.

French workers have tried to use pieces of the dried spinal cord after the same procedure as that followed in rabies treatment but the results were too uncertain to be practical. Dr. E. C. Rosenow of the Mayo Clinic has used an antistreptococcus serum to treat acute cases but this is a recent development that has not received any general application.

Science News-Letter, August 20, 1927

An Italian ship fitted out as a floating fair to exhibit Italian manufactures recently visited ports of South Africa.

CHEMISTRY—PSYCHOLOGY

Tongue Test for Ice Cream

The human tongue is a better scientific instrument than it is usually credited with being, at least so far as the great American dish, ice cream, is concerned. Recent experiments made by the U. S. Department of Agriculture indicate a rather close correspondence between the "taste test" of a large number of people and the more precise determinations of quality made by instrumental means.

The first test involved three ice creams of varying butter fat content. These, containing 18, 15 and 12 per cent., were fed to 50 daily purchasers for a period of 10 days. In each instance freezing and hardening conditions were alike, the consumer changing his choice at will. The result was that 82 per cent. of the samplers favored the ice cream of 18 per cent. butter fat content.

The second test proposed to show whether or not sugar strongly affects the palatability of ice cream. An experiment was made with mixes containing 19, 16 and 13 per cent. of cane sugar. About 90 per cent. of the consumers preferred the 16 per cent. composition.

The third experiment tested the effect of non-fat milk solids on the palatability of ice cream. For a period of six weeks three mixes of 12, 9 and 6 per cent. non-fat milk

(Just turn the page)

Automobile Cancer Cause?

The automobile is faced with charge of being an indirect cause of cancer. Dr. Chevalier Jackson, well-known bronchoscopist of Philadelphia, is inclined to believe that the inhalation of gasoline fumes and small particles of tar in the air may be implicated in the surprising increase in cancers of the lungs that has taken place in the last ten to fifteen years.

Dr. Jackson's suggestions relating to the cause of cancer of the lung receive support from an analysis of a number of cases recently reported to the British medical journal, *Lancet*, by Dr. J. B. Duguid, of the Welsh National School of Medicine. A remarkably large proportion of these cases which all came from Manchester, one of the industrial centers of northern England, were occupied in one way or another with road traffic.

Most of them were carters and drivers, said Dr. Duguid, who were daily exposed to gasoline fumes and oil particles from passing motors as well as the tar used on the road.

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Ice Cream Test

(Continued from page 121)

solids were sold. More than 80 per cent. of the 1,185 sales showed a preference for a 9 per cent. non-fat milk solid rather than the commercial ice cream with but 6 per cent.

A debated point among ice cream magnates concerns the popularity of ice cream containing gelatin. For years it was used much as a stabilizer, that is, to prevent the ready formation of ice crystals. Nowadays iceless refrigeration eliminates that possibility, so many manufacturers do without gelatin altogether.

Yet some persons prefer the smooth taste gelatin gives to ice cream. Indeed, experiment four showed that some 63 per cent. of 394 purchasers preferred ice cream with 1 per cent. gelatin. Twenty-three per cent. wanted ice cream entirely without it, and the others insisted on a content of 0.5 per cent.

Contrary to popular belief, the fat content of ice cream has little effect on the quantity a person will eat. A test was made with two common grades of ice cream, one containing 10 per cent. fat and the other 15 per cent. It was found that the average person can consume 1.2 pints of the 10 per cent. and 1.12 pints of the 15 per cent. cream.

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California uses more lumber than any other state in the Union.

Improper horseshoeing is the cause of a large proportion of horse diseases.

The daughter of the famous Egyptian ruler, Cheops, had light, bobbed hair.

An elephant's foot swells when he puts weight on it, and contracts when it is lifted.

The United States is using 70 million pounds of artificial silk made from wood each year.

Great peat bogs in northern Japan are fast disappearing owing to reclamation of the land.

A Greek library of the fifth century B. C. consisted of rolls of papyrus kept in rows of baskets.

The entire Sierra Nevada range, extending over some 400 miles, is geologically a single mountain.

The oldest Egyptian medical records show that they used adhesive tape and splints in surgical operations.

MEMORANDUM

This blank space serves a dual purpose. It allows you to clip out the article on the reverse of this page without destroying any other article. It can also be used for notes and the recording of your own observations.

Earthquake Factory

(Continued from page 121)

People are prone to blame earthquakes for disasters for which the earthquakes themselves are not responsible. The terrific loss of life and property in the Tokyo-Yokohama earthquake, for instance, was partly due to the great typhoon which accompanied it. When fire broke out in the stricken areas, the typhoon fanned the flames to such intensity that nothing could resist them.

The earthquake problem is primarily an engineering one. The problem concerns the construction of engineering structures in such a way as to resist disturbances of the earth's surface. Bridges, buildings, water mains, sewerage systems, and pipe and conduit lines of all kinds must be studied. At the present time, a building is being erected in Tokyo designed to resist both earthquake and fire. Only time, of course, can determine the success of this experiment, but it is a step toward saving of life and property through scientific building construction.

In studying the earthquake problem, the attention of scientists is centered largely in Japan, simply because Japan is the world's "earthquake factory." In the United States, several agencies are at work. Back of them is the Federal Government, doing part of the work and giving encouragement to the other agencies. The work is of immense practical importance, nationally as well as internationally. We should not forget that the United States has experienced severe earthquakes in five distinct regions in the last 150 years.

The U. S. Coast and Geodetic Survey is in charge of earthquake investigation in the United States and its possessions. This Bureau has started an earthquake census, so that the architect, the engineer, the insurance man, and the public generally may have exact knowledge of all earth shocks occurring in the United States and its territories. The Bureau is operating seismographs, to record earthquake shocks, at six widely scattered observatories from Porto Rico to the Hawaiian Islands and is aiding in the interpretation of seismograph records from a number of universities.

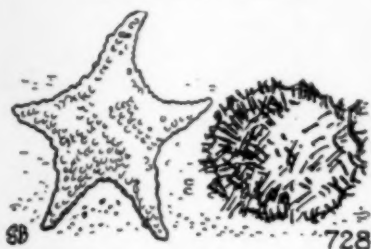
The total of seismological work in the United States, by all organizations, is considerable, but still far from adequate. We will never need the intense effort of Japan, but we should at least carry on the work with a proportionate amount of effort corresponding to our rather fortunate position on this unstable globe.

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BIOLOGY

NATURE RAMBLINGS

By FRANK THONE



Starfish and Sea-Urchins

Seashore vacations yield many treasures that delight the children and may well be of much interest to their elders. And of all the creatures cast by the sea upon the sand none are more strange or fascinating than the starfish and its cousin the sea-urchin.

They belong to an animate world that is basically alien to us. We can get used to the idea of a fish, or a salamander, or even an insect, for in all these the legs and wings and fins and eyes and other organs are like our own; either in pairs, strung along a central body-axis or, like mouths and noses, are balanced evenly on both sides of the center line. But starfish and sea-urchins have their most prominent body-parts set like wheelspokes around a central point, and such bilateral arrangements as they have are obscured by the more obvious plan. Such a wheelspoke arrangement is called "radial symmetry," and these animals used to be known as "radiates."

A newer name, however, has taken its place: "echinoderms," which means "spiny-skins." The spininess of the sea-urchin's integument requires no comment, particularly if you happen inadvertently to step on one of them. It is less obvious on the starfish, but there is at least an armature of decided prickles and little hard knobs.

Starfish and sea-urchins are stiff, almost stony things as we get them at curio shops or see them in museums. That is because of the numberless bits of limy material that form their outer crust. But when they are alive, they have a considerable degree of flexibility, and starfish especially can move over the rocks and sand with considerable rapidity. Starfish are hated by oystermen, because their favorite food is oysters and other shellfish. They kill them by wrapping themselves about their shells, until the poor smothered mollusc is forced to open up, even to certain death.

Science News-Letter, August 20, 1927

PALEONTOLOGY

Fossils Found in Asphalt

Bones that tell what kind of animals roamed the valleys of California a hundred thousand years ago, while eastern America was buried under the great glacial ice sheet, have been discovered in an asphalt bed in Carpinteria, in the southern part of Santa Barbara County. Sealed for ages against decay in the germ-excluding bitumen, they are only now being brought to light and are finding their way to the Santa Barbara Museum of Natural History, where a group of specialists have been studying them.

The report of these scientists tells a dramatic story of beasts and birds now extinct, but resembling existing forms and in some cases practically duplicating them. They have found bones of deer, horses, rabbits and even of skunks. Beasts of prey were represented by three species of the fox-wolf group. There were fifteen species of birds, including a kind of wild peacock, a species of duck, and a pair of very modern crows.

"For wheresoever the carcass is, there will the eagles be gathered together." This text receives startling illustration in the makeup of the group of birds whose bones were discovered in the asphalt pits. There were 28 specimens of one kind of eagle, 15 of hawks, and several of owls, vultures and condor-like birds. Among the latter was one giant, known as *Terrornis*, which was at least as large as the modern condors, the largest birds that fly.

The usually accepted theory is that herbivorous animals trying to cross the treacherous sticky tar-like stuff were entangled and killed, and that the predatory animals and birds, coming to feast on their bodies, were in their turn caught.

In addition to the animal bones there were many pieces of wood, pine cones, and other plant remains. These tell a fascinating story of their own. At the present time there exists on the shores of Monterey Bay, 200 miles to the north, a group of trees found nowhere else on earth. The outstanding trees are two species of pine and two of cypress. Of these peculiar plants, specimens of both of the pines and one of the cypresses have been found embedded in the asphalt here at this distant point, together with fragments of other plants now characteristic of the Monterey region. This indicates clearly that the present Monterey flora is the last remnant of a plant community that once had a far wider range. These living trees may well be looked upon

almost as living fossils, that have survived from an earlier age, while the animals that once roamed beneath them and the birds that nested in their branches have long since vanished.

Science News-Letter, August 20, 1927

HORTICULTURE

Copper Improves Muck Land

What is one plant's poison is another plant's medicine. Copper, long regarded as an element not friendly to plant growth, has been used to increase the productivity of certain muck lands used for vegetable growing in western New York by E. L. Felix of Cornell University.

"The productive and unproductive muck look just alike and no biological, physical or chemical differences have been found between them, except in the response to copper treatment," Mr. Felix says. "With copper, lettuce and onions grow normally; without it they do little or nothing. Applications of 100 to 200 pounds of pulverized copper sulfate crystals prevented the occurrence of unproductive muck symptoms. Dusting or spraying affected lettuce with small quantities of copper sulfate caused the plants already affected to become healthy in appearance."

Science News-Letter, August 20, 1927

HYGIENE

Life Extension Valuable

Behold the cash value of living longer than our grandfathers did! The increase in earning power of our population in this generation for men alone amounts to \$2,300,000,000 per year. Accurate data on the earning capacity for women is lacking, but estimates made by statistical experts of the Metropolitan Life Insurance Company put the total increase in earning power since 1901 at \$3,500,000,000.

This gain in ability to earn money has come about as the result of the recent improvement in extension of life, the experts declare. In 1901 a male at birth was considered to have a potential worth of \$7,553, but in 1924 the value of the average baby boy was calculated at \$9,333. The gain of \$1,780 potential value at birth is due to the longer life an individual can now be expected to live with a consequent longer period of earning capacity.

Science News-Letter, August 20, 1927

The U. S. Bureau of Entomology is investigating the fondness of insects for various kinds of vegetable fiber used in upholstering furniture.

Science Service Books

Buy books through SCIENCE SERVICE. We have cooperated with leading book publishers, and have taken part in editing the books listed below. Just order through us—we will give you prompt and efficient service.

CHATS ON SCIENCE

By Edwin E. Slosson.
New York: The Century Company. 1924.
\$2.00.

ANIMALS OF LAND AND SEA

By Austin Clark. Library of Modern Sciences.
New York: D. Van Nostrand Co. 1925.
\$3.00.

SCIENCE REMAKING THE WORLD

Edited by Otis W. Caldwell and Edwin E. Slosson.
New York: Doubleday, Page & Co. 1923.
\$2.50 and \$1.00.

THE EARTH AND THE STARS

By C. G. Abbot. Library of Modern Sciences.
New York: D. Van Nostrand Co. 1925.
\$3.00.

KEEPING UP WITH SCIENCE

Edited by Edwin E. Slosson.
New York: Harcourt, Brace & Co. 1924.
\$2.50.

MYSTERY OF MIND

By Leonard Troland. Library of Modern Sciences.
New York: D. Van Nostrand Co. 1926.
\$3.00.

WHY THE WEATHER?

By C. F. Brooks.
New York: Harcourt, Brace & Company. 1924.
\$2.00.

FOUNDATIONS OF THE UNIVERSE

By M. Luckiesh. Library of Modern Sciences.
New York: D. Van Nostrand Co. 1925.
\$3.00.

SOIL AND CIVILIZATION

By Milton Whitney. Library of Modern Sciences.
New York: D. Van Nostrand Co. 1925.
\$3.00.

CHEMISTRY IN THE WORLD'S WORK

By H. E. Howe. Library of Modern Sciences.
New York: D. Van Nostrand Co. 1926.
\$3.00.

CHEMISTRY IN MODERN LIFE

By Svante Arrhenius, translated and revised by
C. S. Leonard. Library of Modern Sciences.
New York: D. Van Nostrand Co. 1925.
\$3.00.

EVERYDAY MYSTERIES

By Charles Greeley Abbot.
Young People's Shelf of Science. Edited by E. E. Slosson.
New York: The Macmillan Co. 1923.
\$2.00.

DWELLERS OF THE SEA AND SHORE

By William Crowder.
Young People's Shelf of Science. Edited by E. E. Slosson.
New York: The Macmillan Co. 1923.
\$2.25.

STORIES IN STONE

By Willis T. Lee. Library of Modern Sciences.
New York: D. Van Nostrand Co. 1926.
\$3.00.

Any book listed above—or any book in print—will be sent to any address on receipt of list price plus postage.

SCIENCE SERVICE

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First Glances at New Books

A HISTORY OF THE PHARAOHS. Volume I—Arthur Weigall—*Dutton* (\$6). In the first volume of this important work, Mr. Weigall has brought together and re-interpreted old original records, so that much new light is shed on the dark ages in the first eleven dynasties. The author's deductions as to the Egyptian calendar and chronology result in a new system of dates, more complete and precise than any heretofore presented.

Science News-Letter, August 20, 1927

PIKE, PICKEREL AND MUSKALONGE—A. C. Weed—*Field Museum* (\$75). Last summer the pike, as the "President's fish," stirred up a lot of popular ichthyological discussion. This booklet gives accurate and authoritative information about the American pikes and pike-like fishes in easily readable form. It is illustrated with eight good colored plates.

Science News-Letter, August 20, 1927

MORPHOLOGY AND MECHANISM OF THE INSECT THORAX—R. E. Snodgrass—*Smithsonian Misc. Coll. Vol. 80, No. 1*. A monograph of great value to entomologists and students of comparative anatomy.

Science News-Letter, August 20, 1927

EUROPEAN SKETCHES—M. A. DeVitis and others—*Univ. of Pittsburgh* (\$60). A series of six radio travel talks.

Science News-Letter, August 20, 1927

SPRING: THE NATURALIST AFIELD—O. E. Jennings and S. H. Williams—*Univ. of Pittsburgh* (\$75). A series of ten radio talks on natural history subjects.

Science News-Letter, August 20, 1927

THE MYSTERY AND LURE OF PERFUME—C. J. S. Thompson—*Lippincott*. A popularly written and well illustrated account of some of the lore of scents and cosmetics, from the famous preparations of Egypt, Persia, and Rome down to present-day chemical masterpieces.

Science News-Letter, August 20, 1927

AN INTRODUCTION TO THE STUDY OF EXPERIMENTAL MEDICINE—Claude Bernard—Translated by Henry Copley Greene—*Macmillan*. The first English translation of one of the great medical classics—the law and the gospel of scientific medicine.

Science News-Letter, August 20, 1927

MY JOURNEY TO LHASA—Alexandra David-Neel—*Harper* (\$4). Even in these days of many books and much journeying about, the traveler who can tell us about Thibet and the sacred, forbidden city of Lhasa wields a pen dipped in magic. Needless to say, Mme. David-Neel, the only woman who has penetrated the forbidden city, (and the mother-by-adoption of a Thibetan Buddhist priest), writes a story of many adventures. She also succeeds in painting a vivid picture of the strange life in the Himalayas.

Science News-Letter, August 20, 1927

CHINA IN TURMOIL—Louis Ma-grath King—*Houghton Mifflin* (\$4.50). Chinese bandits, soldiers, diplomats, politicians—we read about their exploits in the news, and are inclined to fit them all into one stereotyped mold, the inscrutable oriental. As an antidote for such vague ideas, this set of seventeen personality sketches is highly effective. In presenting some of the varied personalities that are shaping the destiny of China, Mr. King indirectly sheds considerable light on the puzzling, shifting Chinese scene.

Science News-Letter, August 20, 1927

THE EARLY HISTORY OF MAN. Anthropology leaflet 26—Henry Field—*Field Museum of Natural History* (\$25). Another of the useful museum leaflets which tell a great deal about a subject in a few pages. Readers who are casually acquainted with the history of prehistoric man will be interested in Mr. Field's special discussion of the Cap-Blanc skeleton, the only paleolithic skeleton which the United States has obtained from Europe.

Science News-Letter, August 20, 1927

IMMIGRANTS AND THEIR CHILDREN 1920, Census Monographs No. VII—Niles Carpenter—*Government Printing Office* (\$1.50). Many tables of census statistics covering all angles of the subject are included in this volume, with considerable reading matter interpreting the figures.

Science News-Letter, August 20, 1927

THE HUMANIZING OF KNOWLEDGE—James Harvey Robinson—*Doran* (\$1). In slightly less than a hundred pages, this essay skilfully brings about an informal introduction between the reader and that supposedly cold and shadowy entity, scientific knowledge. The first volume of a new series of little books on great subjects, written for the average man.

Science News-Letter, August 20, 1927

HOW OLD ARE FOSSILS? Geology leaflet 9—Sharat K. Roy—*Field Museum of Natural History* (\$25). You have read about the great dinosaurs who lived 15,000,000 years ago. You have also read, no doubt, about the great dinosaurs (the very same dinosaurs) who lived 200,000,000 years ago. And if you are not a geologist, you may have wondered. How the age of the earth and its oldest inhabitants is reckoned in different ways is explained compactly in this 11-page leaflet.

Science News-Letter, August 20, 1927

THE DETERMINATION OF HYDROGEN IONS—W. Mansfield Clark—*Williams & Wilkins* (\$5). The latest word on this important field in chemical technique. The success of this book may be judged by the fact that the second edition is now in its third printing.

Science News-Letter, August 20, 1927

FISHES IN THE HOME—Ida M. Mellen—*Dodd, Mead* (\$1.75). Out of her wealth of experience at the New York Aquarium, Miss Mellen tells of dozens of attractive small fish species which may be used with advantage to give variety to the domestic fish bowl.

Science News-Letter, August 20, 1927

THE PRACTICAL VALUE OF BIRDS—Junius Henderson—*Macmillan* (\$2). A compact and handy reference book on economic ornithology as entertaining as it is useful.

Science News-Letter, August 20, 1927

A CONTRIBUTION TO EXPERIMENTAL TELEPATHY—G. H. Estabrooks—*Boston Society for Psychic Research* (\$40). The writer reports an experiment in mental telepathy with normal people used as subjects and offers the results frankly "for what they are worth." After mathematical procedures he finds that individuals named red or black playing cards with a larger percentage of correct choices than chance would have given, when in rooms adjoining the experimenter.

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STUDIES ON CLONORCHIS SINENSIS—Ernest Carroll Faust and Oo-Keh Khaw—*The American Journal of Hygiene Monographic Series*. A detailed and thorough study of the parasite that causes clonorchiasis, a characteristic infection of the fresh water fish-eating sections of the Orient, undertaken by investigators at the Peking Union Medical College.

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How to Use Key-Word Feature of News-Letter

In order to aid in catching the items that concern you and to facilitate clipping and filing, a key word in small capitals has been printed on the right of the line above each article. The key words used fit into any system of classification, whether it be a straight alphabetical file, a system of your own devising, the Library of Congress classification or the Dewey system.

Note that you can slip out any article without fear of damaging another article in which you might be interested, since editorial matter printed on the right-hand pages is backed by advertising, standing matter or a continuation of the article on the other side.

Library of Congress Classification

The classification of the Library of Congress has come into common use in the libraries of the country owing to the publication of the Government of the card index of all new books. We print below a list of the subject titles which are most used in the SCIENCE NEWS-LETTER. The full scheme of classification is contained in "Outline Scheme of Classes," issued by the Library of Congress.

A	General Works. Polygraphy.
B	Philosophy.
BF	Psychology.
G	Geography, voyages, travel.
GA	Mathematical and astronomical geography.
GB	Physical geography.
GC	Oceanology and oceanography.
GF	Anthropogeography.
GN	Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archaeology.
GR	Folklore.
GT	Manners and customs.
GV	Sports and amusements. Games.
HC	Economic history and conditions. National production.
HD	Economic history. Agriculture and Industries.
HE	Transportation and communication.
HF	Commerce.
HM	Sociology. General.
HQ	Family. Marriage. Woman.
HV	Social pathology.
L	Education.
M	Music.
N	Fine arts.
P	Philology and linguistics.
Q	Science. General.
QA	Mathematics.
QB	Astronomy.
QC	Physics.
QD	Chemistry.
QE	Geology.
QH	Natural history.
QK	Botany.
QL	Zoology.
QM	Human anatomy.
QP	Physiology.
QR	Bacteriology.
R	Medicine. General.
S	Agriculture. General.

SB	Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD	Forestry.
SF	Animal culture. Veterinary medicine.
SH	Fish culture and fisheries.
SK	Hunting. Game protection.
T	Technology. General.
TA	Engineering. General.
TC	Hydraulic engineering.
TD	Sanitary and municipal engineering.
TE	Roads and pavements.
TF	Railroads.
TG	Bridges and roofs.
TH	Building construction.
TJ	Mechanical engineering.
TK	Electrical engineering and industries.
TL	Motor vehicles. Cycles. Aeronautics.
TN	Mineral industries. Mining and Metallurgy.
TP	Chemical technology.
TR	Photography.
TS	Manufactures.
TT	Trades.
TX	Domestic science.
U	Military science. General.
V	Naval science. General.

Dewey Classification

The main divisions of the Dewey Decimal Classification, used in many libraries and by many individuals, is given below for the convenience of those who wish to use this system:

000	GENERAL WORKS—
010	Bibliography
020	Library economy
030	General encyclopedias
040	General collected essays
050	General periodicals
060	General societies
070	Newspapers
080	Special libraries. Polygraphy.
090	Book rarities
100	PHILOSOPHY—
110	Metaphysics
120	Special metaphysical topics
130	Mind and body
140	Philosophical systems
150	Mental faculties. Psychology
160	Logic
170	Ethics
180	Ancient philosophers
190	Modern philosophers
200	RELIGION—
210	Natural theology
220	Bible
230	Doctrinal. Doctrines. Theology
240	Devotional. Practical
250	Homiletic. Pastoral. Parochial
260	Church. Institutions. Work
270	Religious history
280	Christian churches and sects
290	Ethnic. Non-Christian
300	SOCIOLOGY—
310	Statistics
320	Political science
330	Political economy
340	Law
350	Administration
360	Associations. Institutions
370	Education
380	Commerce. Communication
390	Customs. Costumes. Folklore
400	PHILOLOGY—
410	Comparative
420	English
430	German
440	French

450	Italian
460	Spanish
470	Latin
480	Greek
490	Minor Languages
500	NATURAL SCIENCE—
510	Mathematics
520	Astronomy
530	Physics
540	Chemistry
550	Geology
560	Paleontology
570	Biology
580	Botany
590	Zoology
600	USEFUL ARTS—
610	Medicine
620	Engineering
630	Agriculture
640	Domestic economy
650	Communication. Commerce
660	Chemical technology
670	Manufactures
680	Mechanic trades
690	Building
700	FINE ARTS—
710	Landscape gardening
720	Architecture
730	Sculpture
740	Drawing. Decoration. Design
750	Painting
760	Engraving
770	Photography
780	Music
790	Amusement
800	LITERATURE—
810	American
820	English
830	German
840	French
850	Italian
860	Spanish
870	Latin
880	Greek
890	Minor languages
900	HISTORY—
910	Geography and travels
920	Biography
930	Ancient history
	Modern
940	Europe
950	Asia
960	Africa
970	North America
980	South America
990	Oceania and polar regions

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Anniversaries of Science

August 24, 79—The eruption of Mt. Vesuvius which destroyed Herculaneum, Pompeii and Stabiae took place.

My uncle was at Misenum, where he was in personal command of the fleet. On the ninth day before the calends of September at about the seventh hour (1 p. m.), my mother, observing the appearance of a cloud of unusual size and shape, mentioned it to him. . . . Immediately upon hearing her remark he called for his shoes, and ascended to a spot from which he could more easily observe this marvelous phenomenon. The cloud was to be seen gradually rising upwards, though from the great distance it was uncertain from which of the mountains it arose; it was afterwards, however, ascertained to be Vesuvius. In appearance and shape it strongly resembled a tree; perhaps it was more like a pine than anything else, with a stem of enormous length, reaching upwards to the heavens, and then spreading out in a number of branches in every direction. I have little doubt that either it had been carried upwards by a violent gust of wind, and that the wind dying away, it had lost its compactness; or else that, being overcome by its own weight, it had decreased in density and become extended over a large surface. At one moment it was white, at another dingy and spotted, just as it was more or less charged with earth or with ashes.

To a man so eager as he was in the pursuit of knowledge, this appeared to be a most singular phenomenon, and one that deserved to be viewed more closely.

The elder Pliny accordingly crossed the bay and went to the home of his friend Pomponianus in Stabiae where he remained until sometime in the night.

The court-yard which led to his apartment had now become filled with cinders and pumice-stones to such degree that if he had remained any longer in the room, it would have been quite impossible for him to leave it. On being aroused, he immediately rejoined Pomponianus and the others, who had in the meanwhile been sitting up. They then consulted together whether it would be better to remain in the house or take their chance in the open air, as the building was now rocking to and fro from the violent and repeated shocks, while the walls, as though torn up from their very foundations, seemed to be at one moment carried in this direction, at another in that. Having adopted the latter alternative, they were now alarmed at the showers of light calcinated pumice-stones that were falling thick about them—a risk, however, to which, as a choice of evils, they had to submit. In taking this step I must remark that, while with my uncle it was reason triumphing over reason, with the rest it was only one fear getting the better of the other. Taking the precaution of placing pillows on their heads, they tied them on with towels, by way of protection against the falling stones and ashes.

—Pliny the Younger, in a letter to Tacitus written at the time of the eruption.

The spinning-jenny, with which one spinner could spin 120 threads, was invented by a poor English weaver about 1750.

August 29, 1831—Faraday obtained the first indications that an electric current can induce another in a different circuit.

The good time was now come. The first paragraph in the laboratory notebook is, "Experiments on the production of electricity from magnetism." His first experiment, detailed in the second paragraph, records the discovery by which he will be forever known.

"I have had an iron ring made (soft iron), iron round and $\frac{7}{8}$ ths of an inch thick, and ring six inches in external diameter. Wound many coils of copper round, one half of the coils being separated by twine and calico; there were three lengths of wire, each about twenty-four feet long, and they could be connected as one length, or used as separate lengths. By trials with a trough each was insulated from the other. Will call this side of the ring A. On the other side, but separated by an interval, was wound wire in two pieces, together amounting to about sixty feet in length, the direction being as with the former coils. This side call B.

"Charged a battery of ten pairs of plates four inches square. Made the coil on B side one coil, and connected its extremities by a copper wire passing to a distance, and just over a magnetic needle (three feet from wire ring), then connected the ends of one of the pieces on A side with battery: immediately a sensible effect on needle. It oscillated and settled at last in original position. On breaking connection of A side with battery, again a disturbance of the needle. . . ."

Writing to his friend R. Phillips, September 23, he says, "I am busy just now again on electro-magnetism, and think I have got hold of a good thing, but can't say. It may be a weed instead of a fish that, after all my labor, I may at last pull up."

—Jones: *Life and Letters of Faraday*

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PHYSICS

Do You Know about Magnets?

The following interesting problem is given in "Scientific Paradoxes and Problems," by A. S. E. Ackermann (London: *Old Westminster Press*):

"Given two straight bars of steel identical in every respect with the exception that one of them is magnetized, in what way can it be determined which piece is magnetized? No third article of *any kind* is to be used. You may not even balance one or both bars on a finger or finger nail, but you may hold the bars in your hands."

Many physicists, engineers and other scientists to whom this problem has been put have been stumped. Think a bit about properties of magnets, and see if you can figure out the answer before next week, when we will publish it in the NEWS-LETTER.

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Possibility of making artificial silk was discussed by a British scientist in the seventeenth century.

Summer Measles Dangerous

Beware of measles in August and September. The Metropolitan Life Insurance Company has just made a study of death rates among its policy holders that reveals that more measles cases die in these two months than at any other time of the year.

Though the regular measles season is late winter and early spring it is up to parents, say health authorities, to exercise every precaution to safeguard the young victims that fall a prey to the disease during this dangerous period.

In the meantime scientific research is closing in on the germ that causes this most contagious of diseases. Drs. J. H. Musser, C. W. Duval and R. J. Hibbard, of Tulane University, New Orleans, have been working with a streptococcus, apparently identical with one first described by Dr. Ruth Tunnick of the John McCormick Institute for Infectious Diseases at Chicago.

The investigators at Tulane isolated their germs from the blood of measles patients in a recent epidemic in New Orleans. From them Dr. Musser prepared a toxin that gave a skin reaction when injected into susceptible people but which failed to show on the skins of those who had had measles. This is considered fairly conclusive proof that the cause of measles has been located. The next logical steps of working out preventive and curative serums are probable developments to be expected in the near future.

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PALEONTOLOGY

New Fossil Porpoise

Porpoises, little brothers of the whales, once swam in the shallow seas that are now dry land in California. A newly discovered fossil, reported by Dr. William K. Gregory and Dr. Remington Kellogg of the American Museum of Natural History, links California of a hundred thousand years ago with South America of today, for the bones dug up by a San Diego naturalist, Charles K. Sternberg, closely resemble those of a small group of living porpoises that are now known only from certain rivers of the southern part of South America. The teeth of the newly discovered fossils are shaped like little battle-axes.

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THE ROMANCE OF MODERN MEDICINE

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